Trainsimming Modern Czech and Slovak trains

Part One beta February 2004

A CD 162 with a fast mail train 1999
Model: Stary

In Part One:

- **Background to Czech railways**
- **Czech locomotive numbering system**
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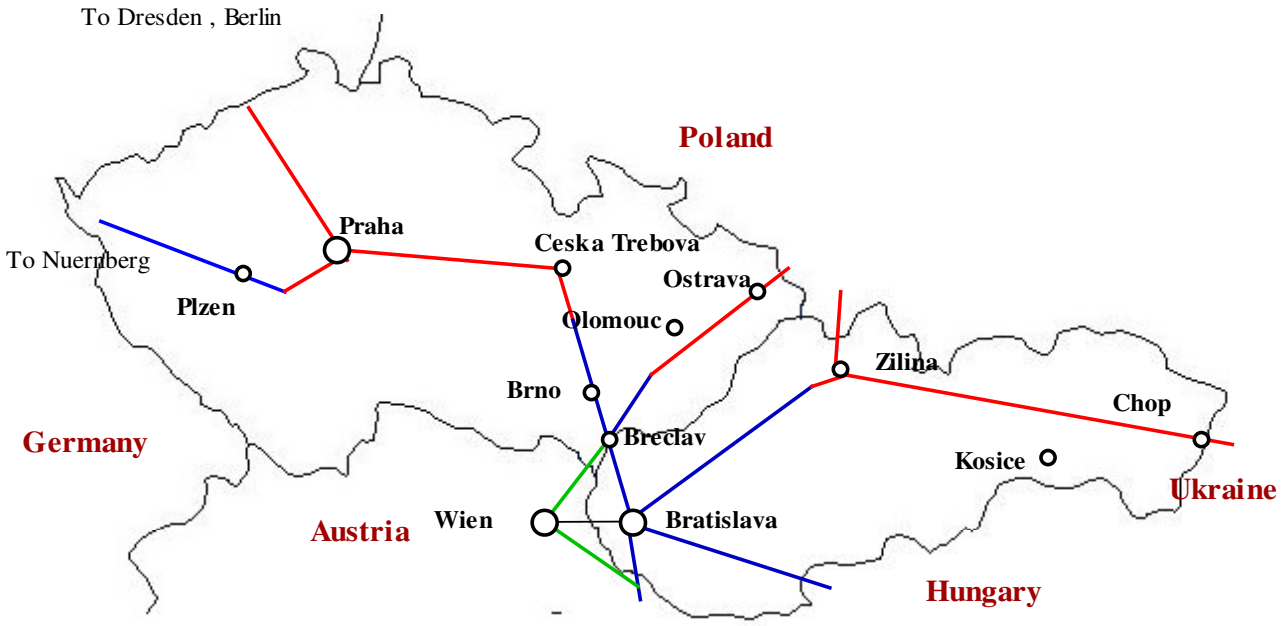
Czechoslovakian diesel and electric locomotives were some of the most colourful and interesting around, which continue to be used by their successor **CD - Ceske Drahy** and **ZSR - Zeleznice Slovenskej Republiky**, together with newer stock, including the new **Pendelino** tilting train.

I have long been an admirer of the MSTS models produced by the Czech and Slovak modellers, although, as far as I was aware, there were no Czech or Slovak MSTS routes available.

The recent arrival of **Vysocina,** a fantasy Czech route set in Bohemia changes this, and allows prototypical operations of at least Czech trains

This guide is a beta, in that while there are plenty of Czech train sites with descriptions in Czech (which I can only pick up a word or two), there is very little material in English or German.

Nevertheless I hope it does justice to the fine work of the Czech and Slovak members of the Trainsim community.



A highly schematic map showing the Trans European Network (TEN) corridors going through Czechia and Slovakia
Blue is electrified at 25kV 25Hz AC, Red 3000 V DC. Green is 15kV AC 16.7 Hz.

For a detailed map of the Czech network see http://www.bueker.net/trainspotting/maps_czechia.php. For Slovakia http://rail.sk/skhist/elektr.htm

Czechia (The Czech republic) is an area of 78.9 sq Km, or just slightly smaller than South Carolina with a population of 10.3m. The capital is **Praha** (Prague), with an urban population of 1.4m, and the next largest towns are Brno 377k, Ostrava 644k, Plzen (Pilsen) 166k and then Olomouc 103K. **Bohemia** in the west consists of rolling plains, hills, and plateaus surrounded by low mountains; **Moravia** in the east consists of very hilly country. The climate is temperate with cool summers and cold, cloudy, humid winters.

The **Slovak** republic is smaller (48.4 sq Km), about twice the size of New Hampshire. It is rugged with mountains in the central and northern part and lowlands in the south. It has a population of 5.5m, and the capital **Bratislava** has a population of 449k, the next city Koshice, five hours by train to the east about 250K.

Bohemia, Moravia and Slovakia came under control of the Catholic Hapsburgs from the 16th century, and were subject states of the Austro Hungarian empire, until WWI. After WWI the Czechs and Slovaks agreed to form a single federal state of two equal republics.

Following WWII Czechoslovakia was re-established as an independent state under Soviet influence. The Communist regime remained in control after the fall of the Berlin Wall in late 1989, until street protests led to a democratic Government following street protests The voices for autonomy in Slovakia were getting stronger, and finally, it was decided by prime ministers of both republics and other leading politicians that splitting the country was the best solution, which occurred peacefully on 1 January 1993.

Both Czechia and Slovakia will become member of the expanded European Union in 2004.

Czech Railways total*:* 9,435 km
standard gauge: 9,341 km (1691km electrified at 3000V DC, 1152km at 25kV 50Hz AC and 44km at 1500VDC; 1,868 km double track)
narrow gauge: 94 km 0.760-m narrow gauge

Slovak Railways:
total: 3,660 km
broad gauge: 102 km 1.520-m gauge
standard gauge: 3,507 km 1.435-m gauge (665km electrified at 3000V DC and 737km at 25kV 50Hz; 1,011 km double track)
narrow gauge: 51 km

The Czechia therefore has three types of electrified line, the Slovak republic two. The later also has braod guage line to the East connecting to Ukraine and the ex USSR system.

There are three lines electrified at 1500V DC, originally electrified at other voltages prior to WW I and re-electrified prior to WWII: **Tábor to Bechynì, Rybník – Lipno** and the narrow gauge **Poprad to Stary** Smokovec in Slovakia.

The Rybnik - Lipno line is currently being re-electrified at 25kV 50Hz AC.

After WWII it was decided to electrify the heavy traffic lines with the 3 kV DC system. The first mountain section of the Slovakian main line from Speck Nova Ves to Zilina was opened on 7. November 1956, whereas the first section in Czechia followed in 1957.

However, in the early 1960's the decision was made to take advantage of the efficiency of the AC system and start building another electrification railway system. Extensions are electrified at 25kV or 3kV as appropriate.

Following the separation of Czechia and Slovakia the assets of **CSD Ceskoslovenske Statni Drahy** were transferred to **CD - Ceske Drahy** and **ZSR - Zeleznice Slovenskej Republiky**.

To follow EU law since 2003 these have now been split into Infrastructure and Operating companies. The new CD is a joint stock company only responsible for management and operation of rail transport, while the infrastructure is now in the hands of state owned organization SZDC, Sprava Zeleznicni dopravni cesty. CD is divided like DD AG into four independent groups, for passenger, freight, operations management and ancillary.

Conversely the "new" ZSR is now only responsible for the infrastructure. The new company **ZSSK - Zeleznicna Spolocnost Slovakia** - operates trains with divisions for passenger trains (DOP), freight operation (DNP) and rolling stock (DZKV).

Since 1993 the major trends have been.

- Extensive upgrading of the track and infrastructure on the major corridors to allow operations at 160 km/hr. (140km/h on less important lines)
- Purchase of new stock, in particularly passenger carriages (CD) and the new Pendelino for 160 km/hr operations, and the modifications of some stock.
- Refurbishment of existing stock, particularly coaching carriages, and purchase of EMUs for Regional trains
- Open access, particularly in Czechia
- Closure of branch line services.

The two countries are crossroads in East – West Traffic and lie on **Trans European Networks (TEN)** or transport corridors, designated for partial EU funding for upgrading.

These are **Corridor IV**, which links Germany and Austria to Greece and Turkey, via Romania and Bulgaria (i.e. avoiding ex Yugoslavia, with two arms from Dresden (Berlin) and Nuremberg, joining at Praha, and then going via Ceska Trebova and Brno to Bratislava and then Budapest.

Bratislava is also on **TEN Corridor V**. linking Ukraine with the Adriatic ports, and is the on **TEN Corridor VI** linking the Baltic polish ports to Czechia and Slovakia

The Czechs designate the main arm of TEN IV as Corridor 1, and the second arm to Nuremberg as Czech Corridor III.

The Czechs designate TEN corridor VI as Transit corridor II. Corridor II earns CD about a quarter of their revenue.

Once work is completed on upgrading Czech corridor I and II, then the other corridors will be improved.

The Czech parliament passed legislation allowing for open access operators in 1994 considerably before joining the EU, and it has the most open access of the ex East European bloc with 8-9% of traffic by open access operators. These include two mining companies OKD Doprava and Viamont, which run trains throughout Czechia, and have also taken on passenger services on Branch lines.

In Slovakia one regional train operator BRKS, has taken over a 40 km branch service abandoned by the ZSSK, initially with 1949 vintage 830 railcars.

Locomotive numbering system

From. January 1988 the Czechoslovakian railways, and now CD and ZSSK, introduced a numbering system of type **000 000-0** for their locomotives and railcars. Only the 1st number determines some technical characteristic of the unit. Since 1996 the 0 numbering is used for cars with independent heating, which are mostly pulled by diesel motor coaches.

Digit	1st digit	2nd digit *If 1st digit = 1,2,3,7*	2nd digit *If 1st digit = 0,4,5,6,8,9*	3rd digit
0	Middle cars in EMUs and cars with independent heating	Light weight locos used for shunting or local trains service	Generation of the unit	Differentiates locos of similar generation or construction.
1	Electric locomotives DC (1500V or 3000V			
2	Electric locomotives AC (25kV)	4 axles locos for freight trains		
3	Electric locomotives two-current			
4	Electric-motor coaches of DC EMUs	4 axles universal or fast trains locos		
5	Electric-motor coaches of AC EMUs			
6	Electric-motor coaches of two-current EMUs			
7	Diesel locomotives	6 axles freight locos		
8	Diesel motor coaches			
9	Steering coaches, except series 990-999 (steam locos)		Maintenance units, but now renumbered	

4th, 5th and 6th digit

- 001--599: serial number, starting with 001. Some numerous classes where is need of serial number higher than 599 use also higher serial numbers (781 600, 810 up to 810 678).
- 401--599: used for private (mostly industrial) locos, which have access to Czech railways' network. What I know, series 401--499 it's used only for class 740, which isn't owned by Czech railways, series 501--599 is used also for another classes, which are not so numerous and theirs highest serial number on Czech railways isn't higher than 499 (mostly classes 730, 742).
- 601--699: units owned by another parts of Czech railways (such as maintenance, infrastructure division)
- 801-899: wide-gauge loco (used only on Slovakia)
- 901-949: 760 mm narrow-gauge loco
- 951-999: 1000 mm narrow-gauge loco

Source http://mercurio.iet.unipi.it/misc/czechnum.htm, which also details the previous system. http://fhavel.wz.cz/zelparametry.html has a conversion table from the old to new system.

Colours

As far as we know, there are no defined colour schemes for Czech and Slovak diesel locomotives. As each class seems to have numerous variations, there are no descriptions of colour schemes in this guide.

Electric locos do generally follow a pattern with the body colours, although the schemes are generally class specific.

DC only locos: predominantly green (Classes 100-183)
AC only locos: predominantly red (classes 210-263)
Dual Voltage locos: predominantly blue (classes 340,350,363,372), for the 3kV DC, 25kV 50 Hz, although the 15 kV AC 16.7Hz ones for going into Germany are Bordeaux coloured.

There are unfortunately exceptions to the rule, i.e. some AC class 210 electric shunters are blue, and 363009 is in a special red livery, and ZSSK 350001 is in a nice red and white two-tone scheme

On the change in 2003 from ZSR to ZSSK the logo on the engines and rolling stock changed from a half wing to a circle type logo.

Class 100

Four small Bo-Bo electrics built in 1956 and 1957 for use on the 1.5kV DC lines.

Class:	**110** **110.1** **111** **113**	**210**
Number Built:	**52** **2** **35** **6**	**74**
Built:	**1971 – 1973** **Some 1981**	**1972-83 in batches**
System:	**3kV DC***	**25kV**
Speed:	**80 km/h**	**80**
Power	**800kW** **760kW** **800kW**	**880kW**
Multi:	**?**	**?**
In Use:	**26**	**33**
CD	**2** **35** **6**	
ZSSK	**22**	**36**

Electric shunter also used for trip freight work, and some passenger work. The 111 have chopper control.

* The 110.0 and 113 have been rebuilt for the 1.5kV DC for use on used on Rybnik - Lipno and Tabor - Bechyne

A ZSSK 110 Model: Stary

Class:	**121**	**122**	**123**
Number Built:	**85**	**55**	**29**
Built:	**1960**	**1967**	**1971**
System:	**3 kV DC**		
Speed:	**90 km/h**		
Power	**2032 kW**	**2040**	**2040**
Multi:			
In Use:	**63**	**51**	**29**
CD			
ZSSK	**13**		

3kV DC Co-Co locomotive used freight duties.

A CD 122 Model: Thunderbird

Class:	**125**
Number Built:	**22 (pairs)**
Built:	**1976**
System:	**3kV DC Broad Gauge**
Speed:	**90 km/h**
Power	**4080 kW**
Multi:	
In Use:	**0**
CD	
ZSSK	**22**
Color:	**Green/ Yellow band**

Unfortunately no model available

Essentially two 123 locomotives joined as a pair, similar to the 131 below, with a driving at each end. Used for broad gauge heavy freight traffic, and can be seen in multi i.e. Two times two engines pulling ore trains.

Class:	**130**
No Built:	**40**
Built:	**1977**
System:	**3kV DC**
Speed:	**100 Km/h**
Power	**2040 kW**
Multi:	
In Use:	**40**
CD	
ZSSK	**0**

A Universal Bo-Bo locomotive, based at Ceska Trebova normally seen on freight.

A CD 130 with a Post wagon – with the rest of the train freight wagons. Model: Stary

Class:	**131**
Number Built:	**50 pairs**
Built:	**1980 - 82**
System:	**3k V DC**
Speed:	**100 km/h**
Power Multi:	**4480 kW**
In Use: CD	**0**
ZSSK	**50**
Colors	**Green with yellow band**

ZSSK 131 with tank train Feb 2002

Class:	**140**	**141**	No model avaliable
Number Built:	**100**	**61**	
Built:	**1953-58**	**1957-60**	
System:	**3 kV DC**	**3 kV DC**	
Speed:	**120 km/hr**	**120 km/hr**	
Power Multi:	**2032 kW**	**2032 k**	
In Use: CD	**6**	**54**	
ZSSK	**4**		

Bo- Bo electrics, some of the 140 are still in use on local passenger trains, and the 141 used for stock movements around Prague.

Class:	**150**	**151**
Number Built:	**27**	**13**
Built:	**1978**	**Rec. 1996-2002**
System:	**3 kV DC**	
Speed:	**140 km/h**	**160 km/hr**
Power Multi:	**4000 kW**	
In Use: CD	**14**	**13**
ZSK	**0**	
Colors	**Vermillion with cream upper**	

A 3kV DC Bo-Bo locomotive used for fast passenger services. The entire class will be rebuilt as Class151 for 160 km/h.

A CD 181 Model: Kirilov Peter

Class:	162	163	263	362	363	371	372
Number Built:	60	111 + 28 R	12	1 + 29 R	181	6 R	15
Built:	1991	1984-91	1984-88	1990-2001	1980-1990	1996-2001	1988 - 91
System:	3 kV DC	3 kV DC	25 kV AC	3 kV DC/25kV AC	3 kV DC / 25V AC	3 kV DC / 15 kV 16 2/3 Hz AC	3 kV DC / 15 kV 16 2/3 Hz AC
Speed:	140 km/h	120 km/hr	120 km/h	140 Km/hr	120 km/hr	160 km/hr	120 km/h
Power Multi:	3480 kW	3480 kW	3060 kW	3060 kW	3060 kW	3080 kW	3080 kW
Pre-dominant Color scheme	Apple green/ Yellow band	Apple green/ Yellow band	Red/ White band	Blue/ Cream band	Blue/ Yellow band; Sly blue/ yellow band	Bordeaux/ cream band	Red/ Yellow band
In Use: CD	29	97	2	9	121	7	9
ZSSK	22	49	10	16	51	0	0

Variation of the same locomotive built by Skoda for different Voltage systems, used for passenger and freight trains, some rebuilt for faster passenger trains.

The 372 is a dual system loco designed for trains going from Czechia into Germany, and the DB (ex DR) also has this class of train. They recently sold one to CD to replace one written off in an accident. The 371 is a re-geared 372 for 160 km/hr

28 * 162 were rebuilt as 163
29 * 362 were rebuilt from 363s
6 * 371 were re-geared from 372

CD 363 070-4 on an Wien-Praha-Berlin EC with DB stock 2002 Model: Stary

Class:	**180** **181** **182** **183**
No Built:	**2** **150** **168** **43**
Built:	
System:	**3 kV DC**
Speed:	**90 km/h**
Power Multi:	**2790 kW**
In Use: CD	**180: 2** **181: 60** **182: 74** **-**
ZSSK	**182: 64** **183: 43**

A 3kV DC Co-Co locomotive used for heavy freight duties capable of pulling 50 tonnes of freight cars as 90 km/hr. The 180 was the prototype

A CD 181 Model: Kirilov Peter

Class:	**230**	**240**
Number Built:	**110**	
Built:	**1966-67**	**Rec. 1984-86**
System:	**25kV AC**	**25 kV AC**
Speed:	**110 Km/h**	**120 km/h**
Power	**3080 kW**	**3080 kW**
Multi:		
Number in Use: CD	**95**	**34**
ZSSK		**99**
Colors	**Bordeaux with yellow stripes; Red with white stripes**	

The 230 are used for freight trains, and many are pictured in a dilapidated condition. The faster 240 are used for both passenger, but mainly for freight.

Three 240s have been modified (in a new blue paint scheme) for dual system 15 kV 16.7 Hz for operation into Austria, on a newly electrified link line and designated **340, painted in a new blue scheme. T**heir output is only a third under 15 kV**.**

A CD 230 Model: Stary

Class:	**242**
No Built:	**86**
Built:	**1975-81**
System:	**25kV AC**
Speed:	**120 Km/h**
Power Multi:	**3080 kW**
In Use: CD	**82**
ZSSK	**0**

A Universal Bo-Bo locomotive, normally seen on Regional trains.

A CD 242 Model: Stary

Class:	**350**
Number Built:	**20**
Built:	**1974 - 1976**
System:	**25kV AC 3kVDC**
Speed:	**160 km/h**
Power Multi:	**4000kW**
Number in Use: CD	**No 0**
ZSSK	**18**

Use: Fast Passenger trains

Dual voltage (3kV DC, 25kV AC) 160 km/h trains capable of making the trip from Breclav and Prague, and also EC trains into Hungary. Recently refurbished in the new multi blue scheme shown above. They are all owned by ZSSK, and are used for all fast trains between Slovakia and Czechia as, as CD doesn't have dual voltage capable of 160km/h.

A ZSSK 350 in latest colour scheme pulling CD stock on the EC 76 Comenius to Praha at Stúrovo (Párkány) May 2003. Model: Stary

Class:	**704**
No Built:	**20**
Built:	**1992**
System:	
Speed:	**65 km/h**
Power Multi:	**250 kW**
Number in Use:	**20**
CD ZSSK	**0**

A small shunter also used by private railways

A CD 181 Model: Ondra Janis

Class:	**708**
No Built:	**13**
Built:	**1995, 1997**
System:	**Electric**
Speed:	**80 km/h**
Power Multi:	**300 kW**
In Use: CD	**13**
ZSSK	**0**

No model available

A small diesel electric shunter.

Class:	**710**	**711**
No Built:	**248**	**2**
Built:	**1961-68**	
System:	**Hydraulic**	
Speed:	**60/30 km/h**	**60/30 km/h**
Power Multi:	**301 kW**	**301 kW**
In Use: CD	**0**	**1**
ZSSK	**27**	**1**

Mo model available

A centre cab shunter, withdrawn by CD, but some still used by ZSSK. The 711 have a completely rebuilt body in a different style.

Class:	**714**	**714.2**
Number Built:	**29**	**43**
Built:	**Rec. 1992-96**	**Rec. 1994-97**
System:	**Electric**	**Electric**
Speed:	**80 km/h**	**80 km/h**
Power	**500 kW**	**600 kW**
Multi:		
In Use:	**29**	**43**
CD		
ZSSK	**0**	
Color	**Blue with red cab**	

The 714 are 29 Locomotives rebuilt from retired class 735 with new Skoda motors (Some are 600kw and 90 km/h). The 714.2 have a lighter axel load. Both have electronic braking

A CD 714 Model: Petr Kouda

Class:	**720**	**721**
No Built:	**150**	**221 +13 broad**
Built:	**1958-1961**	**1962-68**
System:	**Electric**	**Electric**
Speed:	**60 km/h**	**60 km/hr**
Power	**551 kW**	**551 kW**
Multi:		
Number in Use:	**0**	**68**
CD		
ZSSK	**15**	**125**

Shunter and light fright locomotive

A CSD T 435.0 now Class 720. Model (? No readme file)

725

4 Large shunters used by ZSSK of 101 built between 1963 and 166

Class:	**730**	**731**	No Model available
Number Built:	**19**	**62**	
Built:	**1985-89**	**1988-92**	
System:	**Electric AC/DC**	**Electric AC/DC**	
Speed:	**80 km/hr**	**80 km/h**	
Power	**600 kW**	**600 kW**	
Multi:			
In Use:	**19**	**51**	
CD			
ZSSK	**0**	**11**	

Diesel Hood type diesel electrics for shunting and light freight trains with AC/DC transmission.

Class:	**735**	**736**
No Built:	**298**	**2 Rec.**
Built:	**1971-79**	**1998-2002**
System:	**Electric**	**Electric**
Speed:	**90 km/h**	**90 km/h**
Power	**926 kW**	**990 kW**
Multi:		
In Use:	**0**	**0**
CD		
ZSSK	**51**	**2 Proto-types**

The 735 are a universal locomotive with steam heating for trains, though the remaining members are used for freight

The 736 are two prototypes of rebuilt 735s with new engine, completely new body and cabin etc, and there are plans for a further six to be converted. They have Caterpillar engines, microprocessor control and electric brakes.

A CD 735 Model: Stimpy

Class:	**742**	**743**
Number Built:	**453**	**10**
Built:	**1977-86**	**1987-88**
System:	**Electric**	
Speed:	**90 km/h**	**90 Km/h**
Power	**883kW**	**883kW**
Multi:		
CD:	**354**	**10**
ZSSK:	**83**	

Shunters and freight locomotives. The 743 have an electro-dynamic brake.

Also used by private operators and lines.
A CD 742. Model: Ondoej Jani

Class:	**749**	**751/715.3**	**751 (N)**	**752 (ZSSK)**
No Built:	**60**	**239/ 19**	**2**	**82**
Built:	**Rec. 1992-96**	**1964-76**	**Rec. 1996-1997**	**1969-71**
System:	**Electric**			
Speed:	**100 km/h**	**100 km/h**	**100 km/h**	
Power	**1103 kW**	**1103 kW**	**1103 kW**	
Multi:				
No in Use: CD	**60**	**128/ 19**	**2**	
ZSSK	**0**	**81**	**0**	**27**

The class 749 is the class 751 and 752 rebuilt with electric train heating. The 751 are used for freight trains. The remaining CD 751 have been reclassed as 751.3.

The ZSSK 752 locomotives are used for local and fast freight trains

The earlier versions were nicknamed Bardotka, Brigitte Bardot, because of the curved front (This reference dates the engines as well as anybody who understands it.) Production series locos have a slightly more square appearance and are referred to as 'Grumpies' based on them having a somewhat grumpy facial expression

A CD 751 with a grumpy expression with double deck stock on a local service 1999. Model: Stary

Class:	750	753	754	CD 752	755
Number Built:	1991-95	1967-89	1979-80	Rec. 1996	Rec. 1997
Built:	163	408	86	2	1
System:					
Speed:	100 km/h	100 km/h	100 km/h	100 Km/h	100 km/h
Power	1325 kW (Two 1472 kW	1325 kW	1472 kW	1210kW	1470 kW
Multi:					
In Use: CD	119	188	58	2	0
ZSSK	71	0	26	0	1

Use: Passenger and freight – the 753 does not have electric passenger heating and is used for freight.

The famous Goggle eye. The 750 is a 753 rebuilt with electric train heating, The 752 are two 753 with new electrics and motors. The 754 built with electric train heating.

Second hand ones are now appearing throughout Europe used by open access operators. The 755 is a rebuilt 753 with a very futuristic body, but only the prototype built.

A CD 753. Model: Stary

Class:	770	770.5/.6	770.8	771	771.8	771.5
Number Built:	1963-1969*	1967-89	1983 -85	1968 -72	1970-71	1969-71
Built:	110	13	11	198	12	15
System:			Broad		Broad	
Speed:	90 km/h		As 770			
Power	993 kW					
Multi:						
CD				125		
ZSSK	31		11	62	12	

*Single units built 1977 and 1979
** Some rebuilt from braod gauge

A **Co-Co** diesel electric designed to replace steam for heavy duty shunting, Bo-Bo diesels not proving powerful enough. The 771 were built by Strojarske a metalurgicke zavody (SMZ) rather than CKD Praha (Class 770).

Built in the CSSR to a design agreed by the Czech and the Soviet rail authorities, the majority of the production (7000) went to the USSR. The CD has standard gauge versions and the ZSSK standard and wide gauge.

IN CD the use is declining, and normally only used for shunting, but the ZSSK has rebuilt 10 Class 771, retaining only the frame and the bogies as class 773.

See http://www.hobbyseiten.de/T669/t669co.html for full details (in English)

A 770 in typical livery. Model: Vlasuk Roman Reskin ?

Acknowledgements in Part Two